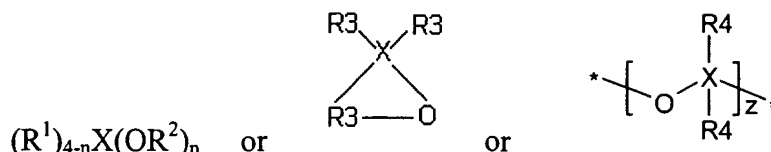


## CLAIMS:

1. A method of forming an organic molecule, comprising contacting a hydrolase enzyme with an organic reactant, wherein:

the organic reactant comprises the formula:



wherein:

X is selected from the group consisting of silicon and germanium;

R<sup>1</sup> is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, alcohol, epoxy, ether, amine,  $-(OXR^4)_y-OXR^4_3$ , and a combination thereof;

R<sup>2</sup> is selected from the group consisting of alkyl, hydrogen, ether and a combination thereof;

R<sup>3</sup> is selected from the group consisting of alkyl, unsaturated alkyl, aryl, hydrogen and a combination thereof;

R<sup>4</sup> is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, hydrogen, hydroxy, alkoxy, alcohol, epoxy, ether, amine,  $-(OXR^4)_y-OXR^4_3$  and a combination thereof;

n is an integer from 0 to 4;

y is 0 or is an integer greater than 0; and

z is 3 or is an integer greater than 3;

the hydrolase enzyme comprises lipase, protease, phosphoesterase, esterase, cutinase or a combination thereof; and

the hydrolase enzyme catalyzes the hydrolysis and condensation of the organic reactant to form the organic molecule.

2. The method according to claim 1, wherein the hydrolase enzyme comprises a lipase enzyme and the lipase enzyme is selected from the group consisting of *Candida*

*antarctica* lipase, *Candida antarctica* lipase B, *Rhizomucor miehei* lipase, wheat germ lipase or a combination thereof.

3. The method according to claim 1, wherein the hydrolase enzyme comprises a protease enzyme and is selected from the group consisting of trypsin, papain, pepsin or a combination thereof.

4. The method according to claim 3, wherein the protease enzyme is trypsin.

5. The method according to claim 1, wherein the formula for the organic reactant is selected from the group consisting of  $(R^1)_4X$ ,  $(R^1)_3X(OR^2)_1$ ,  $(R^1)_2X(OR^2)_2$ ,  $(R^1)_1X(OR^2)_3$  and  $X(OR^2)_4$ .

6. The method according to claim 1, wherein the concentration of hydrolase enzyme is equal to or greater than 1 mg/mL.

7. The method according to claim 6, wherein the concentration of hydrolase enzyme is from about 20 mg/mL to about 60 mg/mL.

8. The method according to claim 7, wherein the concentration of hydrolase enzyme is about 40 mg/mL.

9. The method according to claim 1, wherein the organic reactant to enzyme mole ratio is less than or equal to about 40000:1.

10. The method according to claim 1, wherein the reaction is conducted at a pH from about 5.0 to about 8.0.

11. The method according to claim 10, wherein the reaction is conducted at a pH of about 7.0.

12. The method according to claim 1, wherein the reaction is conducted in an aqueous solution, a solvent or a solventless condition.

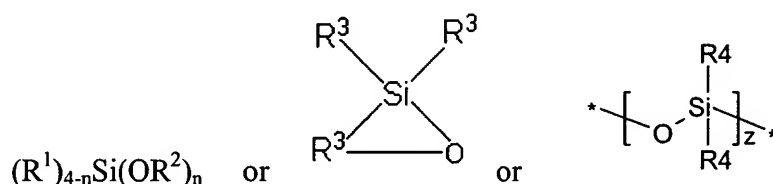
13. The method according to claim 1, wherein the reaction is conducted at a temperature of between about 5°C to about 90°C.

14. The method according to claim 13, wherein the reaction is conducted at a temperature of between about 20°C to about 50°C.

15. The method according to claim 14, wherein the reaction is conducted at a temperature of about 25°C.

16. A method of forming an organosilicon molecule, comprising contacting a hydrolase enzyme with an organosilicon reactant, wherein:

the organosilicon reactant comprises the formula:



wherein:

$R^1$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$ , and a combination thereof;

$R^2$  is selected from the group consisting of alkyl, hydrogen, ether and a combination thereof;

$R^3$  is selected from the group consisting of alkyl, unsaturated alkyl, aryl hydrogen and a combination thereof;

$R^4$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, hydrogen, hydroxy, alkoxy, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$  and a combination thereof;

$n$  is an integer from 0 to 4;

$y$  is 0 or is an integer greater than 0; and

$z$  is 3 or is an integer greater than 3;

the hydrolase enzyme comprises lipase, protease, phosphoesterase, esterase, cutinase or a combination thereof; and

the hydrolase enzyme catalyzes the hydrolysis and condensation of the organosilicon reactant to form the organosilicon molecule.

17. The method according to claim 16, wherein the hydrolase enzyme comprises a lipase enzyme and the lipase enzyme is selected from the group consisting of *Candida antarctica* lipase, *Candida antarctica* lipase B, *Rhizomucor miehei* lipase, wheat germ lipase or a combination thereof.

18. The method according to claim 16, wherein the hydrolase enzyme comprises a protease enzyme and the protease enzyme is selected from the group consisting of trypsin, papain, pepsin or a combination thereof.

19. The method according to claim 18, wherein the protease enzyme is trypsin.

20. The method according to claim 16, wherein the formula for the organosilicon reactant is selected from the group consisting of  $(R^1)_4Si$ ,  $(R^1)_3Si(OR^2)_1$ ,  $(R^1)_2Si(OR^2)_2$ ,  $(R^1)_1Si(OR^2)_3$  and  $Si(OR^2)_4$ .

21. The method according to claim 16, wherein the concentration of hydrolase enzyme is equal to or greater than 1 mg/mL.

22. The method according to claim 21, wherein the concentration of hydrolase enzyme is from about 20 mg/mL to about 60 mg/mL.

23. The method according to claim 22, wherein the concentration of hydrolase enzyme is about 40 mg/mL.

24. The method according to claim 16, wherein the organosilicon reactant to enzyme mole ratio is less than or equal to about 40000:1.

25. The method according to claim 16, wherein the reaction is conducted at a pH from about 5.0 to about 8.0.

26. The method according to claim 25, wherein the reaction is conducted at a pH of about 7.0.

27. The method according to claim 16, wherein the reaction is conducted in an aqueous solution, a solvent or a solventless condition.

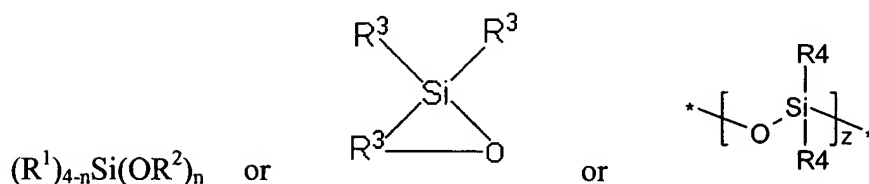
28. The method according to claim 16, wherein the reaction is conducted at a temperature of between about 5°C to about 90°C.

29. The method according to claim 28, wherein the reaction is conducted at a temperature of between about 20°C to about 50°C.

30. The method according to claim 29, wherein the reaction is conducted at a temperature of about 25°C.

31. A method of forming an organosilicon intermediate molecule, comprising contacting a hydrolase enzyme with an organosilicon reactant, wherein:

the organosilicon reactant comprises the formula:



wherein:

$R^1$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$ , and a combination thereof;

$R^2$  is selected from the group consisting of alkyl, hydrogen, ether and a combination thereof;

$R^3$  is selected from the group consisting of alkyl, unsaturated alkyl, aryl, hydrogen and a combination thereof;

$R^4$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, hydrogen, hydroxy, alkoxy, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$  and a combination thereof;

$n$  is an integer from 0 to 4;

$y$  is 0 or is an integer greater than 0; and

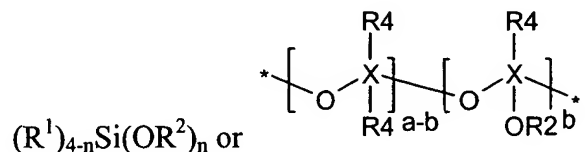
$z$  is 3 or is an integer greater than 3;

the hydrolase enzyme comprises lipase, protease, phosphoesterase, esterase, cutinase or a combination thereof; and

the hydrolase enzyme catalyzes the hydrolysis of the organosilicon reactant to form the organosilicon intermediate molecule.

32. A method of forming an organosilicon molecule, comprising contacting a hydrolase enzyme with an organosilicon intermediate reactant, wherein:

the organosilicon intermediate reactant comprises the formula:



wherein:

$R^1$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$ , and a combination thereof;

$R^2$  is a hydrogen;

$R^3$  is selected from the group consisting of alkyl, unsaturated alkyl, aryl, hydrogen and a combination thereof;

$R^4$  is selected from the group consisting of alkyl, haloalkyl, unsaturated alkyl, aryl, hydrogen, hydroxy, alkoxy, alcohol, epoxy, ether, amine,  $-(OSiR^4)_y-OSiR^4_3$  and a combination thereof;

$n$  is an integer from 0 to 4; and

$y$  is 0 or is an integer greater than 0;

$a + b$  equals  $z$ ;

$z$  is 3 or is an integer greater than 3;

the hydrolase enzyme comprises lipase, protease, phosphoesterase, esterase, cutinase or a combination thereof; and

the hydrolase enzyme catalyzes the condensation of the organosilicon intermediate reactant to form the organosilicon molecule.